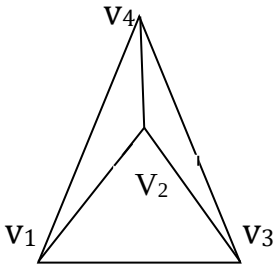
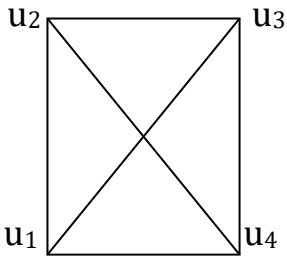
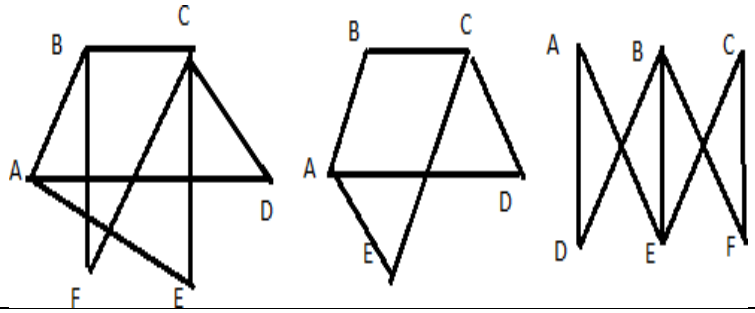
Reg.No:

SNS College of Technology,Coimbatore-35.
(An Autonomous Institution)
Internal Assessment -II
Academic Year 2023-2024 (Odd)
Fifth Semester
Department of Mathematics
19MAT301-DISCRETE MATHEMATICS
(REGULATION 2019)
(Common to CSE,IT & AIML)

A

Time: 1.30 Hours **Maximum Marks: 50**

		PART – A (5 x 2 = 10 MARKS) ANSWER ALL QUESTIONS	CO	BLOOMS
1.		Find the recurrence relation for $a_n = 3.2^n$, n≥1.	CO2	(Rem)
2.		A survey of 1000 from a school produced the following information. 400 play volleyball, 120 play hockey, 80 play both volleyball and hockey. How manyare not playing either volleyball or hockey?	CO2	(Und)
3.		Can a simple graph exist with 15 vertices each of degree 3?	CO3	(App)
4.		Define regular graph with an example.	CO3	(Rem)
5.		Draw the graph with the following adjacency matrix $\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$.	CO3	(Ana)
		PART –B (13+13+14 = 40 MARKS) ANSWER ALL QUESTIONS		
6.	a)i)	Solve the recurrence relation $G(k) - 7G(k-1) + 10G(k-2) = 8k + 6$, for $k \geq 2$.	CO2	(App) (7)
	ii)	Find the number of integers between 1 to 250 that are not divisible by any of the integers 2, 3, 5 and 7.	CO2	(App) (6)
		(or)		
	b)i)	Use the method of generating function to solve the recurrence equation $a_n=3a_{n-1}+1,\ n\geq 1$ given $a_0=1$.	CO2	(App) (8)
	ii)	Out of 100 students in a college, 38 play tennis, 57 play cricket and 31 play hockey, 9 play cricket and hockey, 10 play hockey and tennis, 12 play tennis and cricket. How many play (i)All three games (ii) Just one game	CO2	(App) (5)

		(iii) Tennis and Cricket but not hockey		
7.	a)i)	Define Isomorphism. Establish an isomorphism for the following  G_1  G_2	CO3	(App) (7)
	ii)	State and prove hand shaking theorem. Also prove that maximum number of edges in a connected graph with 'n' vertices is $\frac{n(n-1)}{2}$.	CO3	(App) (6)
		(or)		
	b)i)	Prove that the maximum number of edges in a simple disconnected graph G with n vertices and k components is $\frac{(n-k)(n-k+1)}{2}$.	CO3	(App) (7)
	ii)	Give an example of a graph which is 1). Eulerian but not Hamiltonian 2). Hamiltonian but not Eulerian 3). Both Eulerian and Hamiltonian 4). Non Eulerian and Non Hamiltonian	CO3	(Ana) (6)
8.	a) i)	Solve $a_n - 2a_{n-1} - 3a_{n-2} = 4^n + 6$.	CO2	(App) (7)
	ii)	Determine which of the following graphs are bipartite and which are not. If a graph is bipartite, state if it is completely bipartite.  	CO3	(Ana) (7)
		(or)		
	b) i)	Prove that a connected graph G is Eulerian iff all the vertices are of even degree.	CO3	(App) (7)
		Draw the graph with 5 vertices, A,B,C,D, E such that deg(A) =3 , B is an odd vertex , deg(C) =2 and D and E are adjacent.	CO3	(Ana) (7)

Rem/Und: Remember/ Understand **App:** Apply **Ana:** Analyze **Eva:** Evaluate **Cre:** Create